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ABSTRACT

We consider the effect of abortion legalization on births in the United States. A simple theoretical model demonstrates that the impact of abortion legalization on the birth rate is ambiguous, because both pregnancy and abortion decisions could be affected. We use variation in the timing of legalization across states in the early 1970's to estimate the effect of abortion on birth rates. Our findings indicate that states legalizing abortion experienced a 5% decline in births relative to other states. The decline among teens, women over 35, and nonwhite women was even greater: 13%, 8%, and 12% respectively. Out-of-wedlock births declined by twice as much as births in wedlock. If legalization in some states affected birth rates in neighboring states (through travel to obtain an abortion), comparing births between states will underestimate the actual reduction. Using more distant comparison states increases the estimated impact of abortion legalization on birth rates to about 8%. Applying this estimate to the current level of births, a complete recriminalization of abortion would result in 320,000 additional births per year.

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I. INTRODUCTION

Since the early 1970's, and certainly following the Supreme Court decision in Roe v. Wade in 1973, abortion policy has been one of the most contentious issues in American politics. Although positions are largely developed on philosophical and moral grounds, the empirical magnitude of the effect of legal access to abortion is both important and rarely studied. Our purpose in this paper is to estimate the effects of abortion legalization and the Roe decision on birth rates in the United States.

Recent research regarding the effects of abortion policy on fertility behavior has focused on relatively minor restrictions on abortion access, such as Medicaid funding restrictions and parental consent laws, rather than abortion legalization itself (c.f. Blank *et al.*, 1994; Lundberg and Plotnick, 1995; and Currie, *et al.*, forthcoming). Occasionally, researchers obtained surprising results. Papers by Kane and Staiger (1996), Levine *et al. (1996), and* Matthews et al. (1995) indicate that restrictions on the use of state Medicaid funds to pay for abortions leads to fewer abortions, but to either no change or possibly even a reduction in births. These findings are consistent with a model of fertility behavior where women are less likely to get pregnant in response to an increase in the cost of an abortion. If criminalized abortion is viewed as a very substantial increase in its cost, then an extrapolation of these findings would suggest that birth rates may similarly be unaffected or even reduced if abortion was made illegal.

Our purpose in this paper is to address the impact of abortion legalization in the United States on women's fertility behavior. First, we present a model indicating it is quite possible that the effects of abortion legalization are different than an extrapolation of the effects of relatively minor restrictions on abortions, such as Medicaid funding. The fact that birth rates appear to be largely unaffected by those restrictions does not necessarily imply that we should expect birth rates to be unaffected by legalization. Second, we use variation in the timing of abortion liberalization across states to estimate the effects on birth rates in the United States. Using birth data from Vital Statistics between the years 1965 and 1980 and data from the 1980

Census, we examine three different types of quasi-experiments. First, the change in birth rates in "treatment group" states following liberalization can be compared to changes in "control group" states, where the legal status of abortion was unaltered prior to 1973. Second, in 1973 the treatment reversed. States that previously had not legalized abortion underwent a treatment and can be compared to states that legalized before Roe v. Wade. Finally, birth rates in states legalizing abortion prior to 1973 can be compared to control group states that vary by their distance to a legal state. Since women could travel to a legal state and are more likely to do so if they are closer, such comparisons by distance can examine the extent to which birth rates in control group states also declined as a result of access to legal abortions in other states.

Our findings indicate that legalization of abortion prior to Roe v. Wade in a handful of states in 1970 resulted in a 5% decline in birth rates in those states. The Roe decision itself led to a decline in births in affected states of roughly equal magnitude. Teens, women over 35, and nonwhite women in early legalization states experienced a greater reduction in births of 13%, 8%, and 12% respectively. Out-of-wedlock births declined by twice as much as births in-wedlock. Further evidence indicates that these statistics are understated because of travel between states. The overall birth rate in states legalizing abortion in 1970 fell by 4% relative to births in neighboring states but by twice that relative to far away states. Incorporating these "spillover effects" increases the estimated impact of abortion legalization on birth rates to about 8% nationwide.

II. PREVIOUS RESEARCH ON ABORTION LEGALIZATION

Before proceeding with this analysis, we briefly summarize the research conducted to date on the effects of abortion legalization. Most studies have focused on the experience of a few states that fully legalized abortion in 1970 (Bauman, et al., 1977; Joyce and Mocan, 1990; Kramer, 1975; Quick, 1978; and Tietze, 1973), ignoring the impact of the Roe v. Wade decision in 1973. These studies typically rely on a comparison of fertility behavior before and after the

change in law within those states. This approach is likely to be confounded by general declines in fertility occurring in the 1960s and early 1970s.

The exception is Sklar and Berkov (1974), who compare the decline in birth rates from 1965 to 1971 in states that liberalized their abortion laws versus states that did not. While they find abortion liberalization was associated with a 2% decline in birth rates, this estimate may understate the true effect because women from states with restrictive abortion laws were known to travel to the more liberal states to obtain abortions (Pakter *et al.*, 1973; Potts *et al.*, 1977). Moreover, births in states with no legal changes are compared to all states that had undertaken any type of liberalization, from outright repeal to modest reform laws that would be expected to have very different effects on the birth rate. Furthermore, it is unclear whether the experience of these early liberalization states is applicable to the states that were later affected by the Roe decision, since women in more conservative states that did not liberalize might be less likely to obtain an abortion even after legalization.

III. MODEL OF FERTILITY BEHAVIOR

In this section we develop a stylized model that shows that the relationship between birth rates and the cost of abortion is ambiguous. Importantly, this model demonstrates that if abortion is relatively inexpensive, a large increase in the cost of abortion could reduce the number of abortions and lead to a higher birth rate. A small increase in the cost of abortion, however, may lower the number of abortions through a reduction in the number of pregnancies, leaving the number of births largely unaffected. Thus, we cannot necessarily expect the impact of, say, a repeal of Roe v. Wade to be similar to the recent experience with modest restrictions on abortion access.

In this stylized model, suppose that a woman can choose her risk of getting pregnant, P_{preg}. There is a cost associated with pregnancy avoidance, $C(P_{preg})$, that increases at an increasing rate as the probability of getting pregnant is reduced ($C' < 0$ and $C'' > 0$). If a

woman becomes pregnant, she can either give birth or have an abortion. Let the cost of having an abortion be A and of giving birth be B, where both types of cost include monetary and psychic costs.[1] If a woman acts to minimize costs, then the optimal choice of P_{preg} can be found by working backwards. Once a woman becomes pregnant, she chooses to give birth only if $B < A$. Thus, the cost of a pregnancy is min(A,B). Prior to becoming pregnant, a woman solves a simple cost minimization problem:

$$\underset{P_{preg}}{\text{Minimize}} \quad P_{preg} \cdot \min(A,B) + C(P_{preg}) \ .$$

The assumption that there are increasing marginal costs of reducing the risk of pregnancy ($C'' > 0$) guarantees that $dP_{preg}/dA \leq 0$. Thus, an increase in the cost of abortion will induce a women to reduce her pregnancy risk.

The implications of this model are illustrated in Figure 1. This figure shows that if the cost of an abortion is low enough (i.e. less than the cost of giving birth, B), then all pregnancies are aborted. Within this range, an increase in the cost of abortion lowers the probability of getting pregnant as the alternative of using more effective and costly contraception becomes more desirable. The probability of giving birth, however, is unaffected by the increase in abortion cost. On the other hand, if there is a large increase in the cost of abortion so that it passes the threshold set by the cost of giving birth ($A > B$), then women who become pregnant will choose to give birth rather than abort. Since abortion is no longer an option, further increases in the cost of abortion beyond this level have no effect on the probability of becoming pregnant.

The implications of the model are similar if the cost of giving birth is uncertain at the time pregnancy decisions are made. Between the time of getting pregnant and the time of

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[1]For those women who want to have a baby (i.e. B is negative), it is straightforward to show that the solution to this problem is to set $P_{preg} = 1$ and the abortion decision is irrelevant. The remainder of this discussion assumes that B is positive.

deciding on an abortion (generally 2-3 months), a woman may update her expectations about the cost of giving birth based on new information such as the reaction of the father or other family members to the pregnancy.[2] Such a model would indicate that responses to a change in the cost of abortion are "smoothed", rather than discrete as highlighted in Figure 1. For example, as the cost of abortion approaches the expected value of the cost of giving birth, some women may receive a relatively low realized value of B and choose to give birth rather than abort. In addition, small increases in the cost of abortion may actually *reduce* the probability of giving birth in a model with uncertainty: When the cost of abortion is very low, births may increase as more women get pregnant so that they may observe the value of B and then make a subsequent decision regarding birth.[3] Thus, when the cost of giving birth is uncertain at the time of becoming pregnant, the relationship between the birth rate and the cost of abortion is ambiguous and may even be non-monotonic.

This simple model demonstrates that small increases in the cost of abortion may be associated with large decreases in abortion but no change or even a decrease in births. However, the relationship between the cost of abortion and the birth rate can be both non-linear and non-monotonic so that larger increases in the cost of abortion may lead to more births. Thus, even the sign of the relationship between abortion cost and the birth rate is necessarily an empirical question. Moreover, the recent experience with relatively modest abortion restrictions is of no use if one wishes to evaluate the potential impact of more dramatic restrictions on abortion access.

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[2]Within this framework, access to abortion is different from access to birth control in at least one important respect: abortion access alone provides insurance against the contingency that the information learned after pregnancy makes motherhood less attractive.

[3]The implications of this model are similar to the model developed in Kane and Staiger (forthcoming).

IV. DATA AND METHODOLOGY

We use the legislative history of abortion legalization across states to identify the effects of the policy change on birth rates. Table 1 summarizes this legislative history. For several decades prior to 1967, all abortions were illegal in every state in America. Between 1967 and 1970 a number of states implemented modest reforms making it legal for women to obtain abortions under special circumstances, such as rape or incest. Abortion became widely available in five states in 1970 following repeal of anti-abortion laws in four states (New York, Washington, Alaska, and Hawaii) and a "de facto" legalization in California.[4] Following the 1973 Supreme Court decision in Roe v. Wade, abortion became legal in all states.

This legislative history enables us to categorize states by abortion legality in different years and provides the means to estimate the nationwide impact of legalization. We employ a quasi-experimental design, defining so-called control and treatment groups and analyzing them in much the same way that analysts examine randomized trials. Three different types of quasi-experiments are considered. First, the effect of liberalization in states that changed their abortion laws prior to Roe v. Wade (the treatment group) can be identified by comparing birth rates in these states to birth rates in states where the legal status of abortion was unaltered prior to 1973 (the control group). Two treatment groups are available to compare to control group states.[5] In the analysis to follow we label these groups "repeal states" (among which we include

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[4]In late 1969, the California State Supreme Court ruled that the pre-1967 law outlawing abortion was unconstitutional. Furthermore, evidence indicates that legal abortion was widely available in California beginning in 1970, with legal abortion rates among women living in California being comparable to rates for women living in New York. See Potts *et al.* (1977) pp. 75-77, 149, and see Garrow (1994) pp. 377-80, 410-411, 457, and references cited in footnotes 25 and 76 from chapter 7.

[5]Another group of states may also be defined in which the status of existing abortion prohibitions was unclear on the basis of lower court rulings. We have attempted to analyze this group of states as an alternative treatment group and found no significant difference in fertility patterns between women in these states and control group states. The power of this analysis is limited, however, because of the difficulty involved in defining which states belong in this category. Complications include the level of the court decision, the status of an appeal, and temporary stays on prior rulings. For this reason, these states are included in the "control

California beginning in 1970), "reform states," and "control states," as classified in Table 1. Second, in 1973 the treatment reversed. The effect of Roe v. Wade in treatment group states that had not previously legalized abortion can be identified by comparing birth rates in these states to a control group of states that had legalized earlier.

The results of these analyses may be biased toward zero if, prior to the Roe decision, women travelled to early legalization states to have an abortion. To examine this bias, we consider a third quasi-experiment, comparing birth rates in states legalizing abortion prior to 1973 to control groups of states that vary by their distance to a legal state. Since women could travel to a legal state and are more likely to do so if they are closer, such comparisons by distance can address the extent to which birth rates in control group states also declined as a result of access to legal abortions in other states. Among states that had not legalized abortion prior to 1973 ("non-repeal states"), we calculate whether the state is within 250 miles of a repeal state, 250-750 miles from a repeal state, or more than 750 miles from a repeal state. All distances are calculated as the straight-line distance from each state's population centroid to the population centroid of the nearest county in a repeal state.

Two types of analyses are performed within this quasi-experimental framework. The first simply compares average birth rates between groups of states (weighted by state population of women age 15-45) over the period 1965-1980. Second, we use regression analysis to estimate the differences in log birth rates between groups of states. These regressions control for fixed state and year effects, state-specific linear trends, and a set of state-level control variables that capture the socioeconomic environment that vary across states in a nonlinear manner and may influence birth rates.[6] The regressions are weighted by state population and utilize over 800

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group" in the analysis reported here.

[6]The state-level control variables include per capita income, the crime rate, and the insured unemployment rate. The first two variables are obtained from the Statistical Abstract of the United States, and the insured unemployment rate is obtained from the U.S. Department of Labor, Employment and Training Administration (1983). Per capita income and the insured

observations (16 years for each of the 50 states and Washington D.C.).[7] In both types of analyses we examine whether any difference in birth rates emerges between groups of states following liberalization, and whether this difference dissipates after abortion is legalized in all states in 1973.

We estimate the effects of abortion policies on birth rates, which are defined as the number of births observed per 1,000 women of the appropriate demographic group. The number of births by age and race of the mother, state of residence, and year are obtained for the years 1965-80 from Vital Statistics of the United States. The age groups we consider are 15-19, 20-34, and 35-44. Population estimates are obtained from the 1960, 1970, and 1980 Censuses, and the population for intercensal years is linearly interpolated using these data. We also examine the impact of abortion legalization on births by "legitimacy status" using data from the 1980 Census.[8] These data contain the state of birth and quarter and year of birth for all respondents as well as quarter and year of first marriage for all adults. For all births occurring between 1965 and 1979, we identify an "illegitimate" birth to be one where the child was born prior to the mother's first marriage.[9]

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unemployment rate are included to control for differences in economic conditions across locations and the crime rate is included to control for differences in the social environment within which pregnancy/birth decisions are made.

[7]A few observations are omitted because of missing data on some of the control variables.

[8]Births by legitimacy status are only reported for a subset of states in Vital Statistics. For this research, the lack of statistics for California and New York in the earlier years of our sample period makes the use of these data impossible. Sklar and Berkov (1974) circumvented this problem by contacting these states directly. We attempted this approach as well, but were informed that some of these unpublished records from so long ago were no longer available.

[9]Legitimacy status cannot be determined for about 10% of children in the Census. We estimated models of births by legitimacy status treating the missings as both legitimate and by dropping them from the sample. We report results obtained when the missing data are dropped, but results from both sets of estimates were similar.

V. RESULTS

A. Nationwide Patterns

Figure 2 graphs birth rates on a log scale from 1965 to 1980 separately for women age 15-44 living in repeal states and for women living in states that had no law change until 1973. Birth rates fell sharply in repeal states between 1970 and 1972, by approximately 10%. It is not surprising that the declines in birth rates first appear in 1971, since most abortions are performed in the first trimester and would show up in birth rates 6-9 months later. The decline in birth rates is difficult to interpret, however, because birth rates were falling in states with no law change as well. It is possible that some other factor was causing a general decline in birth rates for all women, and that the decline in repeal states cannot be attributed to abortion legalization. Alternatively, the observed decline in states with no law change may have been the result of improved abortion access for those women who were able to travel to a repeal state.

The difference in birth rates between repeal states and states with no law change is presented in Figure 3. The pattern shows that differences are roughly constant through 1970. A sharp drop of about 6% is observed in 1971 that remains through 1973, indicating that birth rates fell in repeal states relative to states with no law change during this period. Through 1974-75 the difference narrows and then by 1976 and onward, there is very little difference again. In other words, birth rates fell in repeal states relative to states with no law change in exactly the years in which abortion was only legal in repeal states. The partial rebound in 1974-75 may indicate that abortion access in states affected by Roe v. Wade may have grown less quickly following this decision compared to the rapid introduction of abortion services in repeal states in 1970. Corresponding figures for reform states versus states with no legal changes show no distinctive pattern and are not displayed here for purposes of brevity.

The effect of abortion legalization on births by age are presented in Figure 4. The first pattern that may be observed in this figure is that repeal states and states with no law change had very different time series patterns in births by age. In particular, a delay in childbearing that

was stronger in repeal states relative to states with no law change is apparent. Births to teens fell over time in repeal states when compared to states with no law change; the opposite was true for women 35-44. Nevertheless, a reduction in births in 1970 and a rebound in 1973 in repeal states relative to states with no law change is observed in all age groups. The trend among teens and older women makes it difficult to assess the size of the treatment effect for these groups. For women 20-34 it appears that births to women in repeal states dropped by roughly 5% relative to women in states with no law change after 1970 and then fully rebounded by 1974.

Differences in birth rates among nonwhite women between repeal states and states with no law change are shown in Figure 5. Here, we see that a tremendous drop in births of roughly 15-20% occurred during the 1971-73 period in repeal states compared to the pre-1970 period. However, the rebound in births in states that legalized abortion in 1973 is quite small. This may indicate that other changes took place in the early 1970's that differentially affected birth rates of nonwhite women in repeal and other states.

Figure 6 displays differences in legitimate and illegitimate birth rates between repeal states and states with no law change. Illegitimate births appear to be a noisier measure and estimated differences are somewhat erratic. Nevertheless, a significant downward drop on the order of 10-15% in the difference in the rate of illegitimate births is observed between 1971 and 1973. The difference in the legitimate birth rate is roughly 5% over this period.

These results can be summarized and extended by the regression results, reported in Table 2, where the dependent variable is the log birth rate. The regressions control for state and year fixed effects, state-specific trends and some socioeconomic characteristics of the state. The coefficients reported in Table 2 are for a series of dummy variables that indicate whether the state was in a repeal or reform state and also whether it was a year of abortion liberalization prior to Roe (*e.g.* 1971-73 in repeal states), one of the years immediately following Roe (1974-75), or a later year (1976-80). Note that these time periods lag the legal changes by one year, since abortion access is expected to influence birth rates with a 6-9 month lag. The omitted

category in the regressions is states with no law change prior to Roe, so all estimates are relative to these states. Inclusion of state effects in the regressions accounts for any differences that exist between states prior to abortion liberalization. Thus, for example, the first coefficient in Column 1 of Table 2 indicates that birth rates were about 5% lower in repeal states relative to states with no law change in 1971-73, net of any difference that existed prior to 1971.

Findings reported in Table 2 are strongly supportive of an effect of abortion legalization on birth rates. Overall, births in repeal states fell by 5% relative to states with no law change between 1971 and 1973. No statistically significant difference in births between the two sets of states is observed in 1974-75 or 1976-80. Parameter estimates by age, race, and legitimacy status are consistent with the patterns found in Figures 4 - 6. In repeal states, teen and older women's birth rates fell by 13% and 8%, respectively, compared to women in states with no law change. This difference disappeared in the years following Roe v. Wade, although more slowly for teen births. Births to nonwhite women in repeal states fell by 12% just following repeal, but were still over 7% lower than births in other states by the 1976-80 period. Illegitimate births also fell by twice the rate of legitimate births (7.2% versus 3.6%) in repeal states between 1971 and 1973.[10] This difference was also eliminated in the years following Roe v. Wade. Further, a comparison of reform states and states with no law change provides no evidence that modest abortion liberalization reduced birth rates. Therefore, states are combined into repeal and "non-repeal" states in all subsequent analyses.

[10]The larger effect of legalization on teens and older women, and on illegitimate births is consistent with the fertility model presented above. In that model, abortion restrictions could only reduce births for those women with a positive cost of giving birth. Women who "want" to have a baby would have a negative cost of giving birth and the model predicts no effect on births for these women. The groups whose birth rates are most affected by legalization are those for whom the cost of giving birth is more likely to be positive.

B. Geographic Patterns

Women from non-repeal states are known to have travelled to repeal states to obtain an abortion before Roe v. Wade.[11] In effect, this amounts to a contamination of the experimental design, *i.e.* birth rates in non-repeal states may have fallen as the result of access to legal abortion in nearby repeal states. To the extent that this occurs, the relative decline in birth rates in repeal states will understate the true effect of abortion legalization on birth rates. One way to determine the extent of such "spillover effects" on birth rates in non-repeal states is to differentiate them by how far they are to a repeal state. If the cost of having an abortion rises with travel distance, differences in birth rates between repeal states and more distant non-repeal states may provide a more accurate estimate of the total effect abortion legalization had on birth rates.

Evidence of these geographic patterns is presented in Figure 7, which graphs differences in birth rates between repeal states and non-repeal states differentiated by their distance to a repeal state. This figure shows that birth rates in repeal states were trending higher relative to "neighboring" states (within 250 miles), but trending lower relative to far away states (more than 750 miles). Abstracting from these trends, differences in births show a significant dip and then rebound in all sets of states between 1971 and 1973. This pattern is exaggerated when comparing repeal states to farther away states, as we would expect if women living near repeal states travelled to those states to get abortions.

Patterns observed in these figures are formalized in a regression framework and are reported in Table 3. These regressions are analogous to those reported in Table 2 except that the effect of abortion legalization is allowed to vary with the distance from the repeal state to the non-repeal states. Following legalization in 1970, births in repeal states fell by about 4.3%, 6.1%, and 8% relative to non-repeal states that are less than 250 miles away, between 250 and

[11]For example, see the discussion in Potts *et al.* (1977), pp. 76, 349, 354-56.

750 miles away, and greater than 750 miles away, respectively. This finding suggests that abortion legalization in repeal states had a sizable impact on birth rates in nearby states that would make the relative decline in repeal states appear smaller.

Another interesting pattern in the results reported in Table 3 is the rate at which the difference in birth rates converged between early legalization states and states legalizing in 1973. In the set of states closest to early legalization states, there was no statistically significant difference in birth rates by the 1974-75 period. The rate of convergence was slower in states further away. In the set of states furthest from early legalization states, a smaller, but still statistically significant difference in birth rates is observed during the 1974-75 period before convergence is observed by the 1976-80 period. This pattern is consistent with a slower growth in abortion access in these states. As reported in Table 4, in 1976 states further from repeal states still had lower abortion rates, had a lower percentage of women in counties with abortion providers, and had a much larger fraction of women living more than 50 miles from the nearest abortion provider.

These estimates can be used to estimate the extent of spillover. If we assume that legalization in repeal states had no impact on the birth rate in states more than 750 miles away, then these estimates imply that abortion legalization reduced birth rates by 8% in repeal states.[12] By implication, spillover effects on birth rates in states within 250 miles of repeal states were 3.7% (equal to the 8% reduction in births in repeal states relative to far away states less the 4.3% reduction relative to states within 250 miles), and 1.9% (8% less 6.1%) in states between 250 and 750 miles from repeal states. Taking a weighted average of all women by their distance to a repeal state, these estimates imply that births to women in all *non-repeal* states fell by about 2% as some women travelled to repeal states to have abortions performed before Roe v. Wade legalized abortion nationwide.

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[12]To the extent that this assumption is invalid, the estimated effect of repealing abortion prohibitions will still be understated.

VI. DISCUSSION

This analysis has examined the effect of abortion legalization on births in the United States. A stylized model of fertility behavior was presented indicating that the predicted effect cannot be extrapolated from the effect of more modest restrictions on a woman's ability to have an abortion. In particular, more modest restrictions may reduce abortions as well as births while more severe restrictions may lead to an increase in births.

Then we presented three separate quasi-experimental estimates of the effect of abortion legalization. We showed that birth rates in states that legalized abortion prior to Roe v. Wade took about a 5% drop following legalization relative to states that experienced no change in their law. This effect was completely reversed following the Roe v. Wade decision. The reduction in births following legalization was largest for teens (13%) and older women (8%), for nonwhite women (12%), and for illegitimate births (7%). We also provided evidence suggesting that these estimates are actually too low because women living near repeal states travelled to those states to obtain an abortion. Based on a comparison with states far from repeal states, we estimate that spillover effects led to at least a 2% reduction in birth rates in non-repeal states before Roe v. Wade. Combining these estimates, we find that abortion legalization led to about a 7-8% decline in births nationwide, and the Roe decision itself led to a 5-6% decline in births in non-repeal states.[13]

What do these results tell us about the potential effects on births of a change in the current legal status of abortion? If abortion became illegal everywhere in the United States as a result of, say, a constitutional amendment outlawing abortion, we might expect an 8% rise in birth rates. If Roe v. Wade was overturned by the Supreme Court and states had the right to

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[13]These estimates may be obtained in one of two ways. The total effect of legalization may be implied from the 8% effect on birth rates in 1971-73 between repeal states and control states more than 750 miles away from a repeal state. It may also be derived from the initial 5% effect estimated in Table 2 plus the estimated 2% spillover effect. The effect of the Roe decision itself can be calculated as the 7-8% total effect of legalization less the 2% spillover effect generated from women travelling to repeal states prior to the Roe ruling.

outlaw abortion, the effect would depend upon the number of states in which abortion remained legal and their geographic distribution.[14] If only a few states, including California and New York, maintained the legality of abortion, then our findings indicate that births may still increase by as much as 5-6% in those states that recriminalize abortion. Obviously, if more states kept abortion legal, the effect on births would be smaller as spillover effects arising from interstate travel to obtain abortions would increase. Applying these estimates to the current level of births, a reversal of the Roe decision that left abortion legal in the five states that had legalized in 1970 would result in an increase in births on the order of 150,000 per year (5% of the roughly 3 million births in those states that recriminalized). Based on the approximately 4 million births nationwide in 1993, we estimate that a complete recriminalization of abortion would result in perhaps as many as 320,000 additional births per year.

[14]Currently, 13 states (Arkansas, Connecticut, Idaho, Illinois, Indiana, Kentucky, Louisiana, Missouri, Montana, Nebraska, North Dakota, Pennsylvania and South Dakota) have laws on the books that would likely make abortion illegal if Roe v. Wade was overturned (Alan Guttmacher Institute, 1989).

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Table 1: Summary of Abortion Liberalization in the United States

Category	*State and Year of Liberalization*
Repeal States (5): States in which abortion was legally available prior to Roe v. Wade	Alaska (1970) California (1970)[1] Hawaii (1970) New York (1970) Washington (1970)
Reform States (12): States which implemented modest reforms prior to Roe v. Wade making it legal for women to obtain abortions under special circumstances.	Arkansas (1969) Colorado (1967) Delaware (1970) Florida (1968) Georgia (1968) Kansas (1969) Maryland (1968) New Mexico (1969) North Carolina (1967) Oregon (1969) South Carolina (1970) Virginia (1970)
Control States (33): States in which abortion laws were unchanged until Roe v. Wade	Alabama, Arizona, Connecticut, District of Columbia, Idaho, Illinois, Iowa, Kentucky, Louisiana, Maine, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Jersey, North Dakota, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Dakota, Tennessee, Texas, Utah, Vermont, West Virginia, Wisconsin, Wyoming

Notes:

[1]California is categorized as a repeal state starting in 1970 even though no formal repeal legislation was passed. This coding is based upon the 1969 state Supreme Court's decision that the pre-1967 state abortion law was unconstitutional and evidence that legal abortions were commonly practiced in the state by 1970 (c.f. Garrow, 1994; Potts, et al., 1977).

Sources:

Alan Guttmacher Institute (1989), Garrow (1994), and Merz, et al. (1995).

Table 2: Effect of Abortion Legislation on Birth Rates, by Year and Age
(Coefficients multiplied by 100, standard errors in parentheses)

type of state	Period	All Women of Child-bearing Age (1)	By Age			By Race		By Legitimacy Status	
			age 15-19 (2)	age 20-34 (3)	age 35-44 (4)	White (5)	Non-White (6)	Illegitimate (7)	Legitimate (8)
Repeal State	1971-73	-4.96 (0.81)	-13.19 (1.38)	-2.23 (0.79)	-8.15 (1.39)	-3.81 (0.93)	-12.37 (1.62)	-7.17 (3.01)	-3.62 (1.12)
	1974-75	-0.78 (1.13)	-9.76 (1.76)	2.55 (1.10)	-0.13 (1.95)	1.01 (1.31)	-9.07 (2.22)	3.51 (4.26)	-1.08 (1.58)
	1976-80	2.04 (1.55)	-3.94 (2.41)	4.98 (1.50)	7.29 (2.65)	5.52 (1.79)	-7.60 (3.08)	8.99 (5.69)	2.80 (2.12)
Reform State	enactment-1973	1.61 (0.53)	1.53 (0.80)	1.22 (0.51)	-0.05 (0.92)	2.58 (0.61)	1.89 (1.00)	-1.63 (1.88)	1.76 (0.70)
	1974-75	1.56 (0.89)	1.24 (1.35)	1.37 (0.86)	1.43 (1.60)	1.88 (1.06)	1.89 (1.67)	1.03 (3.18)	0.84 (1.18)
	1976-80	0.11 (0.87)	0.07 (1.34)	0.67 (0.85)	4.57 (1.59)	0.12 (1.06)	1.33 (1.72)	1.49 (3.14)	-1.07 (1.17)

Notes:

Dependent variables in these models are the natural logarithm of the birth rate so that all coefficients can be interpreted as percentage changes. All specifications include the following control variables: per capita income, crime rate, insured unemployment rate, state and year fixed effects, and state-specific trends.

Table 3: Effect of Abortion Legislation on Birth Rates,
by Year and Distance away from Repeal State
(Coefficients multiplied by 100, standard errors in parentheses)

	Distance less than 250	Distance between 250 and 750	Distance greater than 750
Repeal State, 1971-73	-4.31 (0.84)	-6.11 (1.04)	-8.04 (1.11)
Repeal State, 1974-75	-0.76 (1.24)	-2.46 (1.45)	-3.21 (1.57)
Repeal State, 1976-80	0.51 (1.70)	0.27 (2.02)	0.35 (2.09)

Notes:

Dependent variables in these models are the natural logarithm of the birth rate so that all coefficients can be interpreted as percentage changes. All specifications include the following control variables: per capita income, crime rate, insured unemployment rate, state and year fixed effects, and state-specific trends.

Table 4: Abortion Utilization and Access After Roe v. Wade
by Distance away from Repeal State

State Characteristics	Repeal States	Non-Repeal States		
		Less than 250 Miles to a Repeal State	Between 250 and 750 miles to a Repeal State	More than 750 miles to a Repeal State
Abortions per 1000 women age 15-44, by state of residence, 1976.	37.3	25.5	19.1	17.8
Percentage of women age 15-44 in 1976 living in counties with an abortion provider.	96.8%	77.0%	52.1%	55.9%
Percentage of women age 15-44 in 1976 that were living in county more than 50 miles from nearest county with an abortion provider.	0.2%	2.2%	8.8%	20.6%

Notes:

Abortion rates by state of residence and data on counties with an abortion provider were provided by the Alan Guttmacher Institute. For each county, miles to nearest county with an abortion provider was calculated as straight-line distance between county population centroids. Population estimates for 1976, by county, were obtained from the National Cancer Institute.

Figure 1: Probabilities of Pregnancy, Birth and Abortion
in a Model with No Uncertainty Regarding Cost of Birth

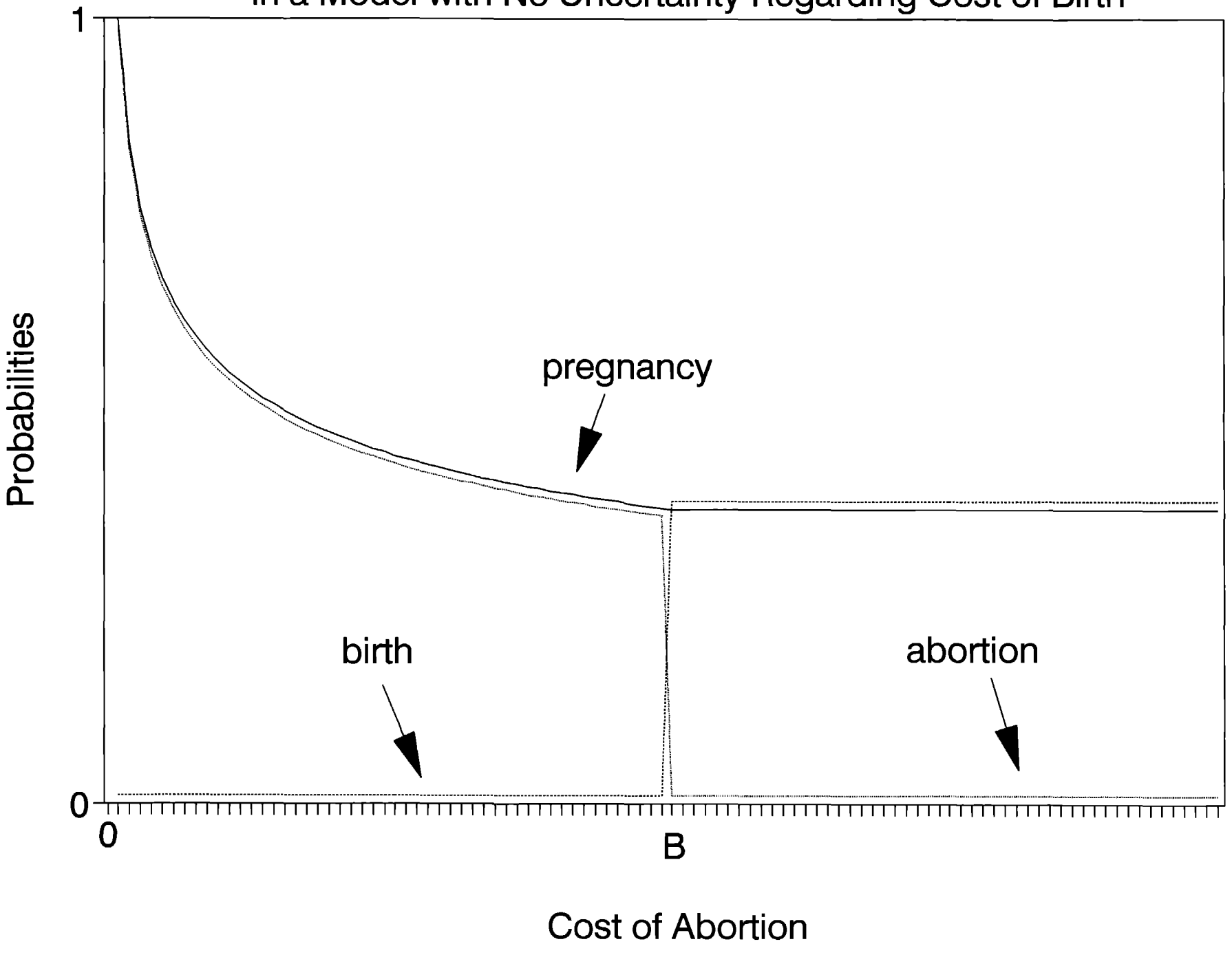

Figure 2: Gap in Log Birth Rates Between Repeal States and States with No Law Change

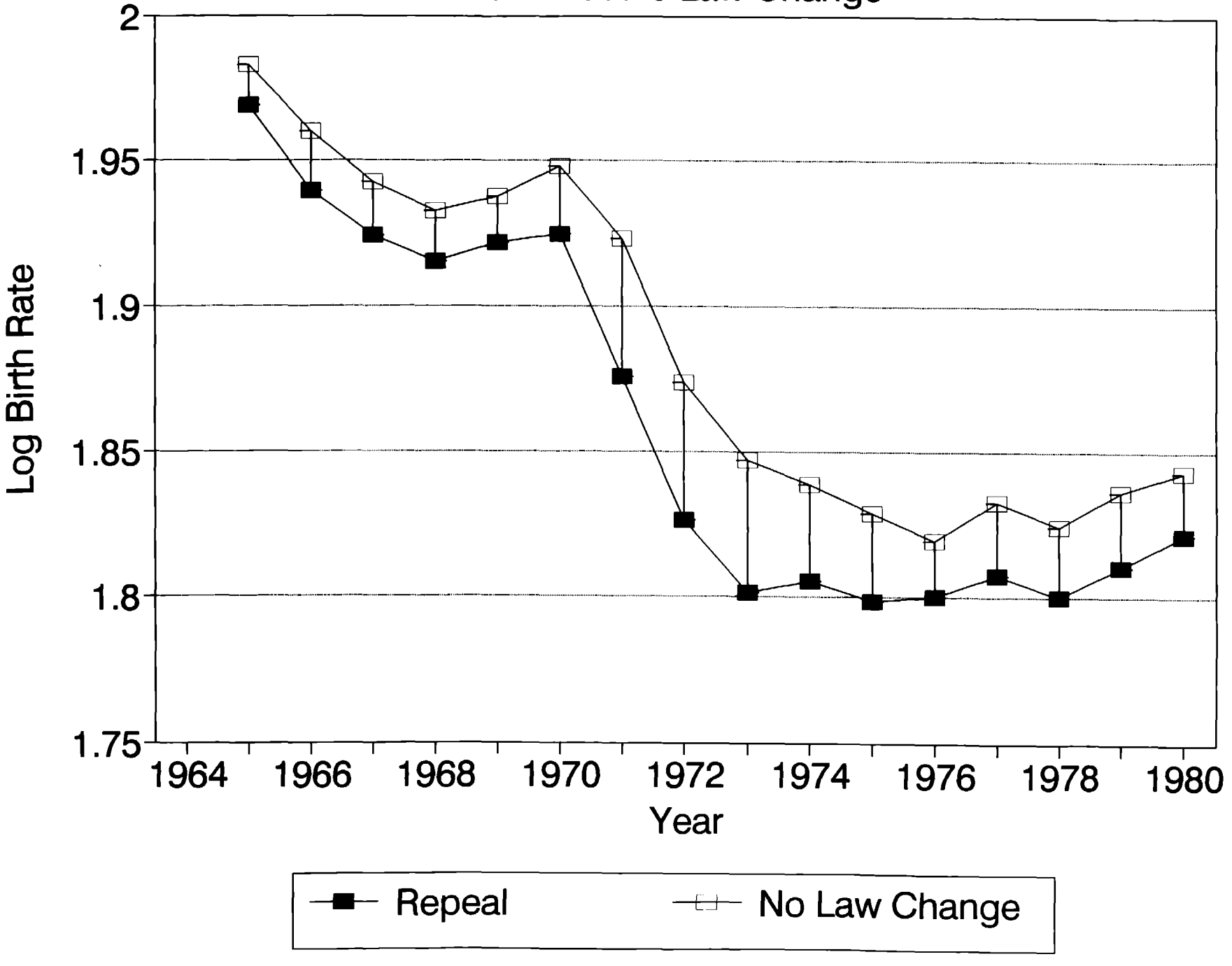

Figure 3: Normalized Percentage Difference in Birth Rates Between Repeal States and States with No Law Change

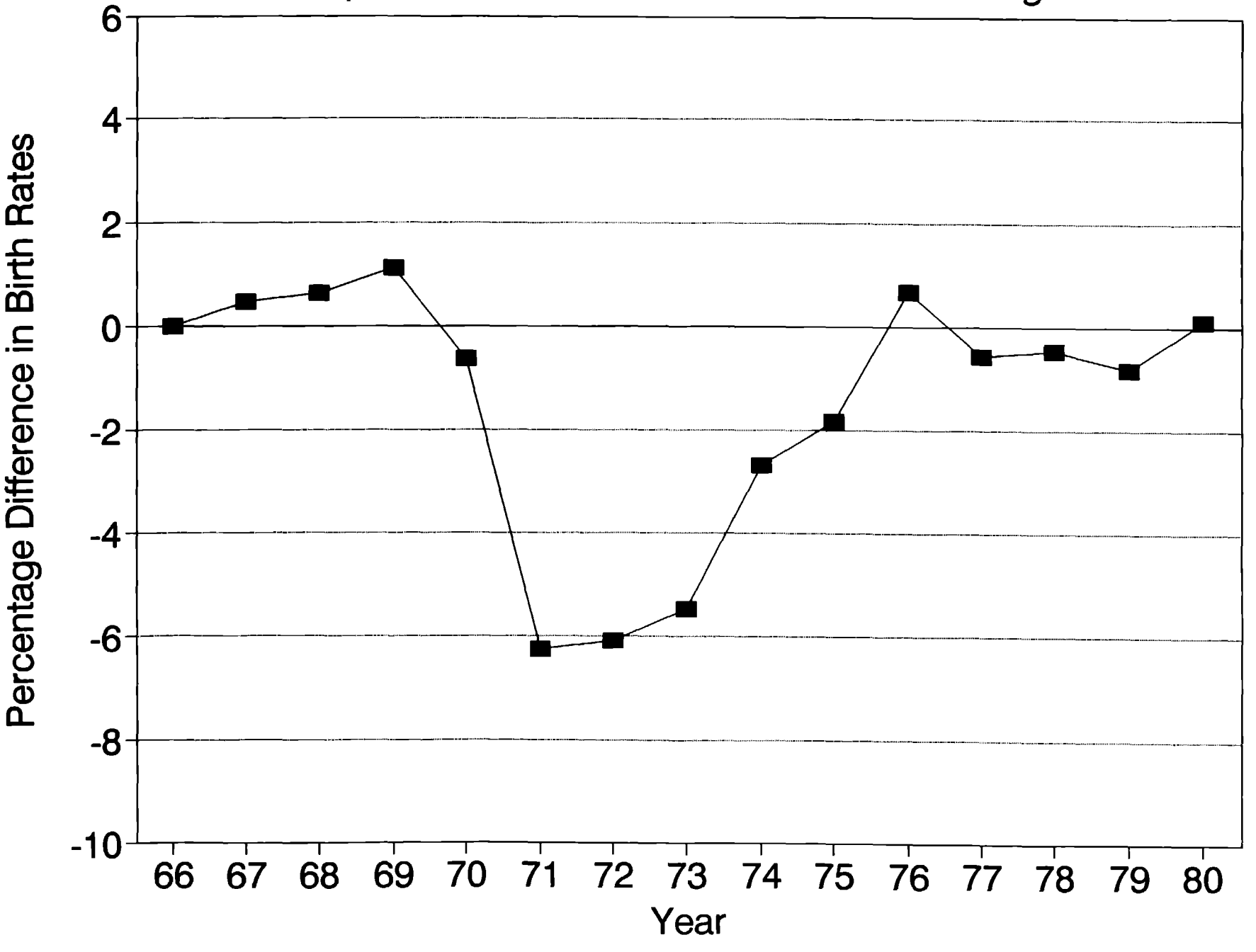

Figure 4: Normalized Percentage Difference in Birth Rates Between Repeal States and States with No Law Change, by Age

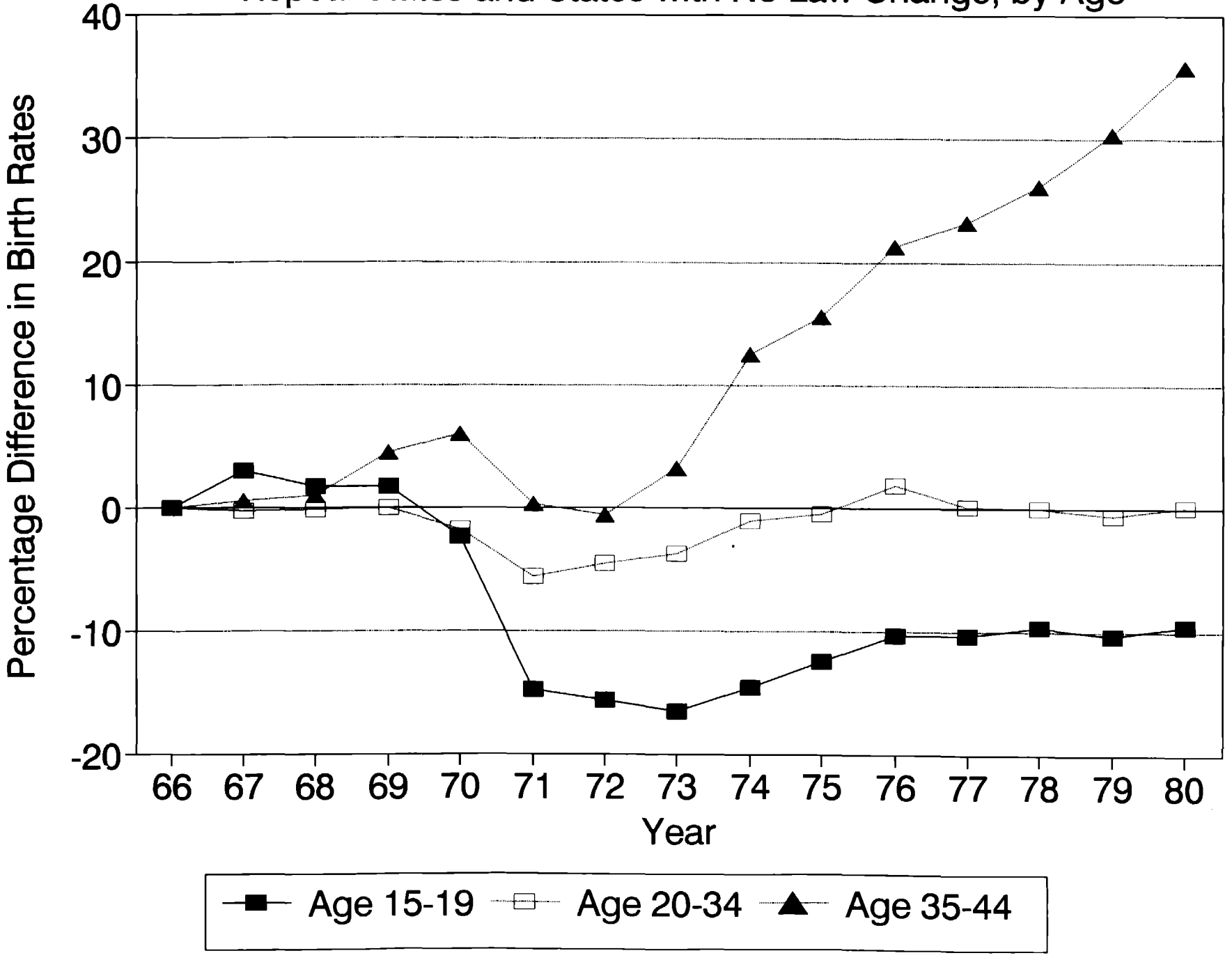

Figure 5: Normalized Percentage Difference in Nonwhite Birth Rates between Repeal States and States with No Law Change

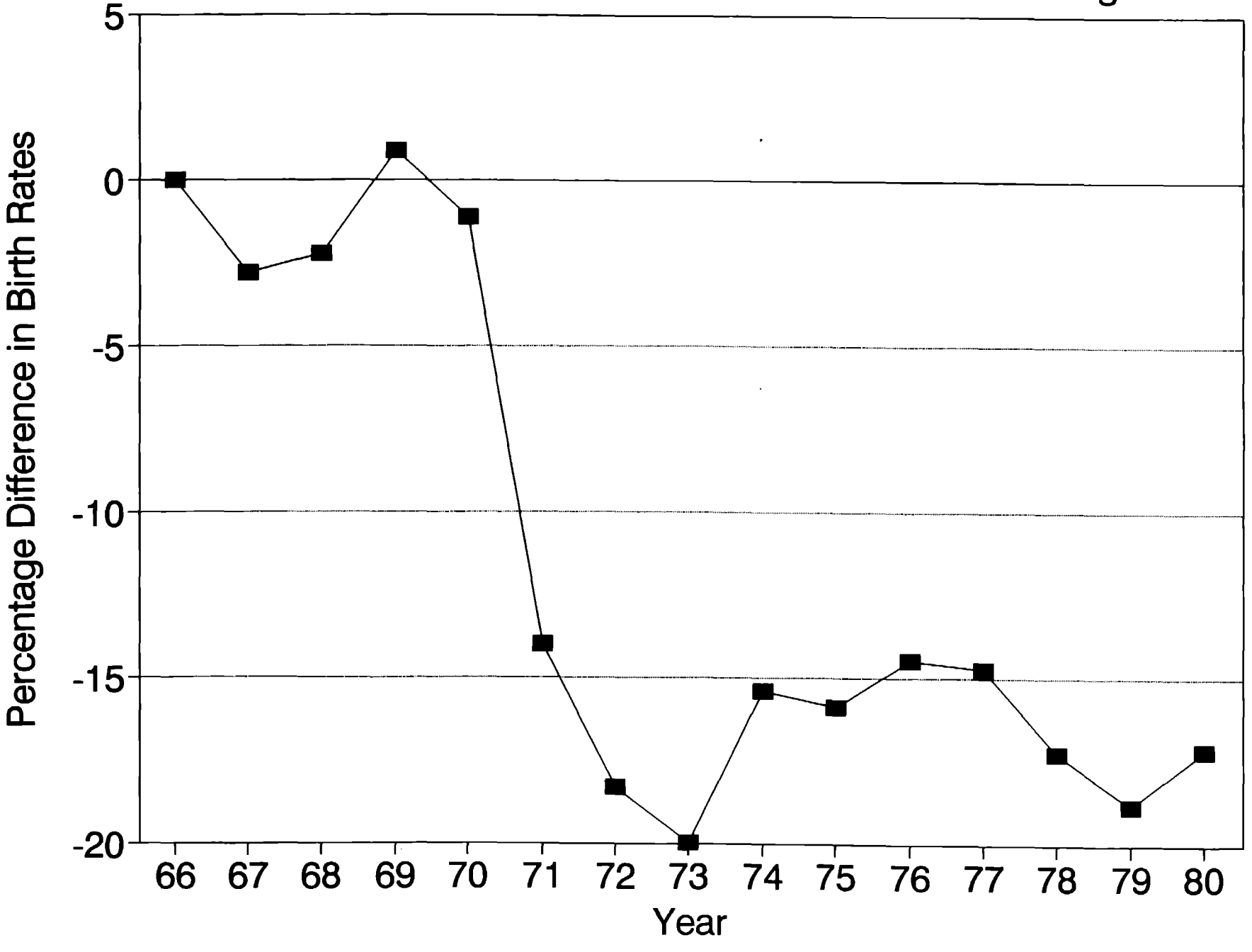

Figure 6: Normalized Percentage Difference in Legitimate and Illegitmate Birth Rates Between Repeal States and States with No Law Change

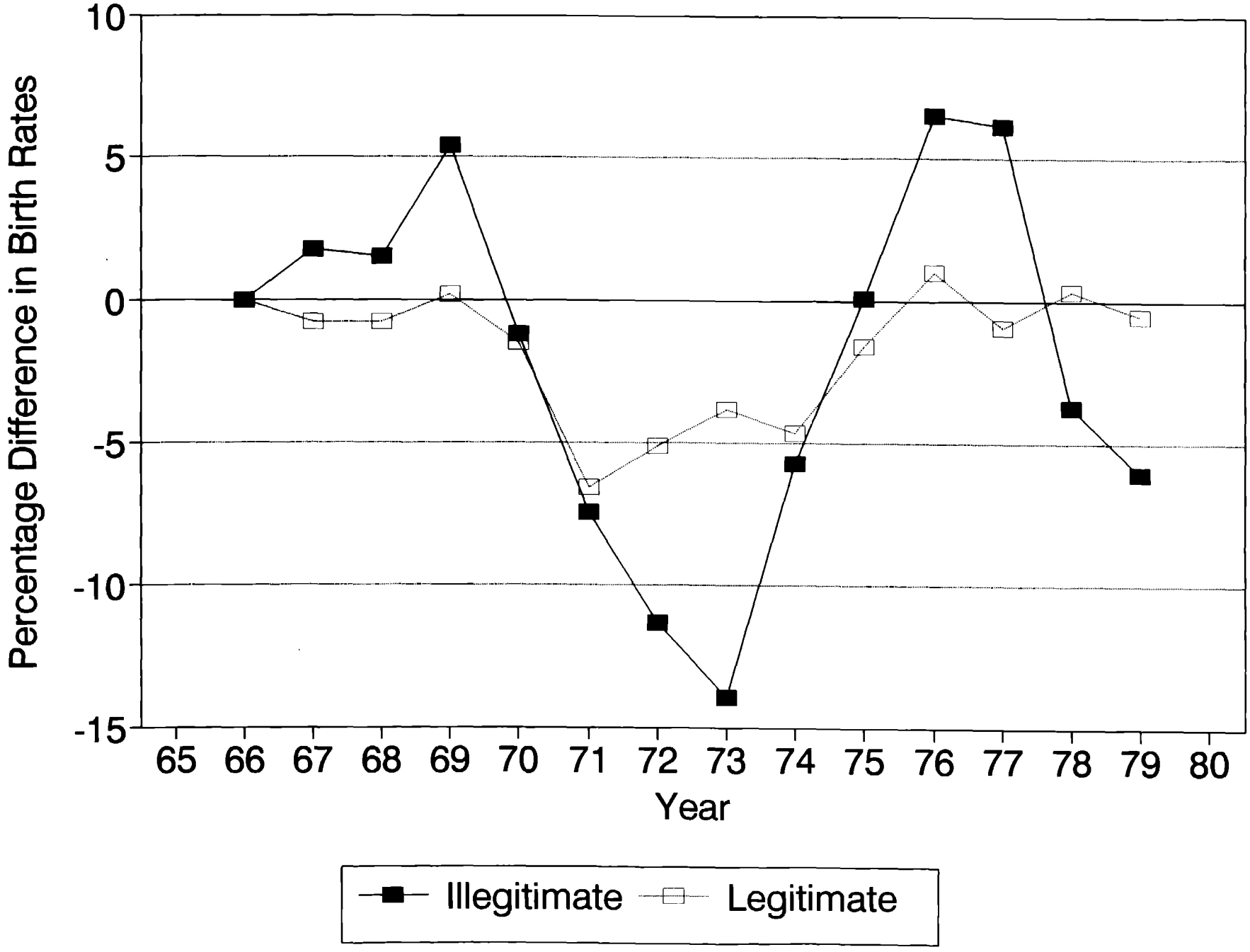

Figure 7: Percentage Difference in Birth Rates
by Distance to Repeal State and Year